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Olivo-cerebellar circuit. Structure and functions

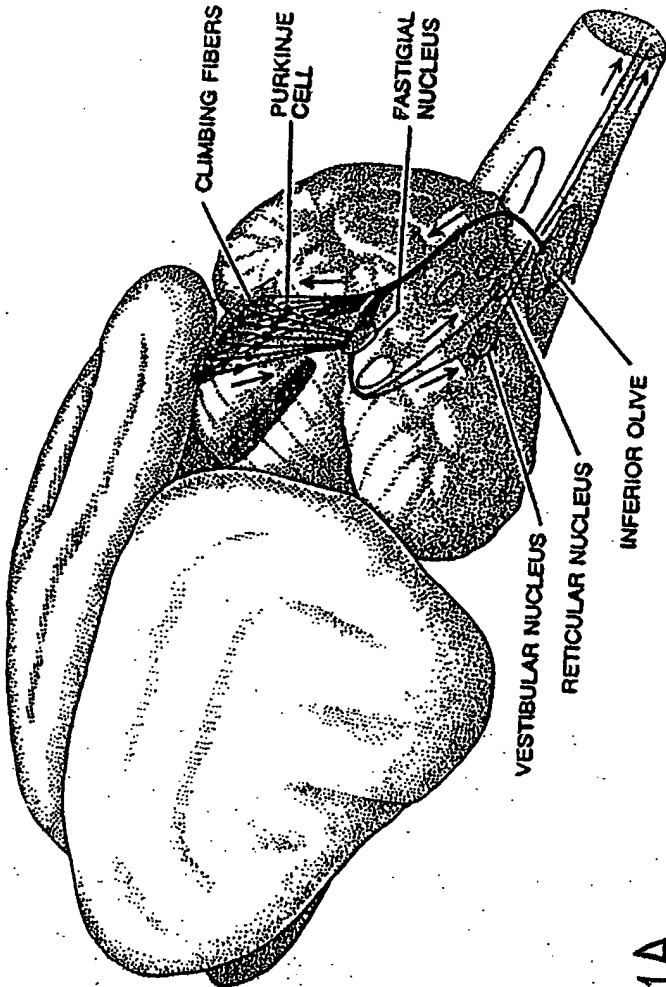


FIG. 1A

Olivo-cerebellar feedback loop.

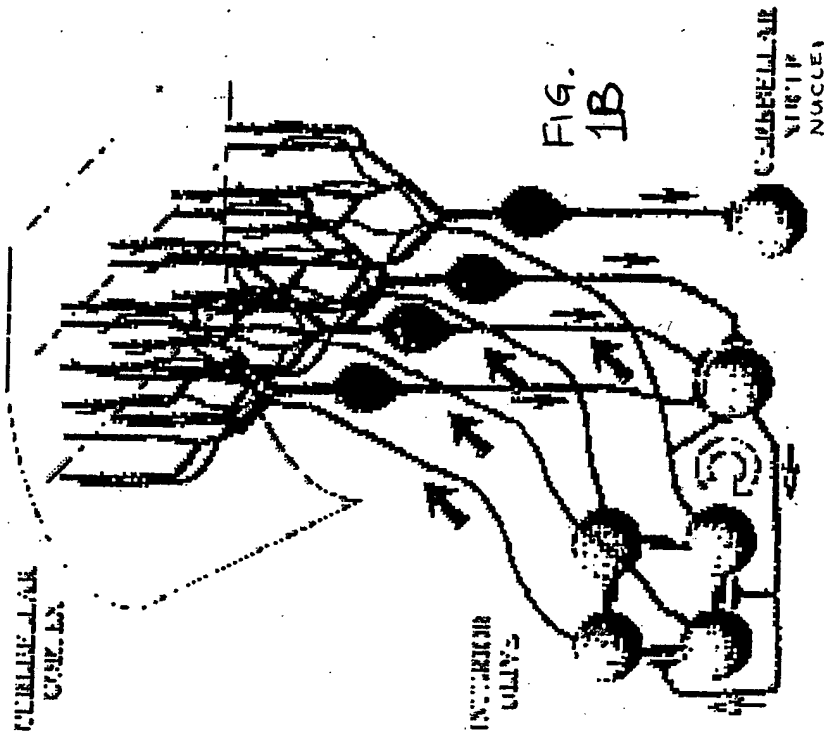


FIG. 1B

Functional circuit.

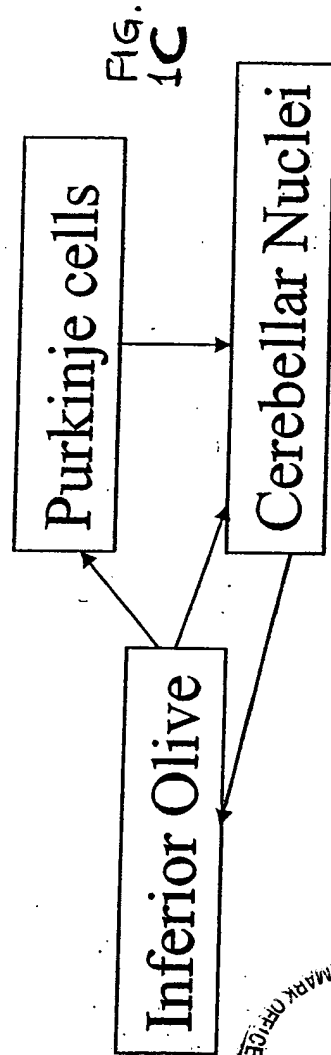


FIG. 1C



ELECTROPHYSIOLOGY OF NEURONES IN OSCILLATION AND RESONANCE 9

FIG. 2A

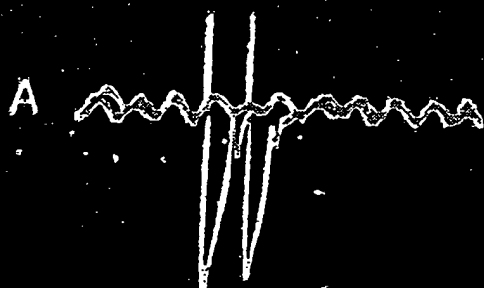
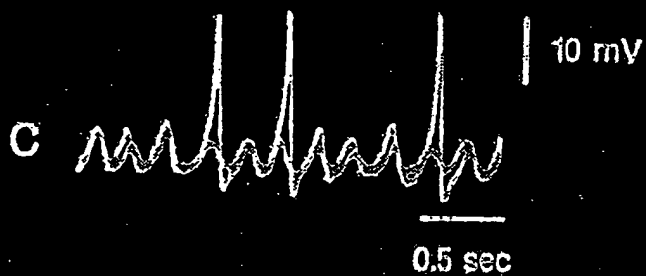


FIG. 2B



FIG. 2C



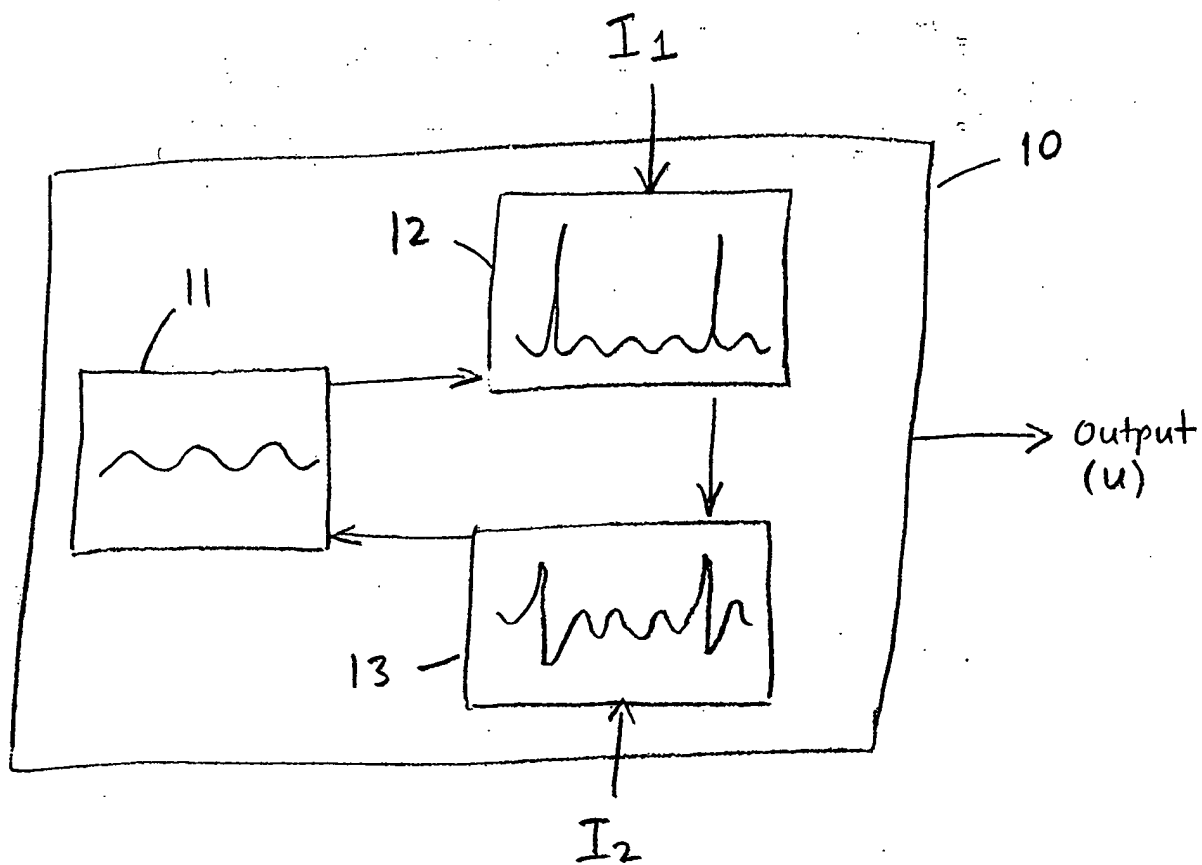


FIG. 3

FIG.
4A

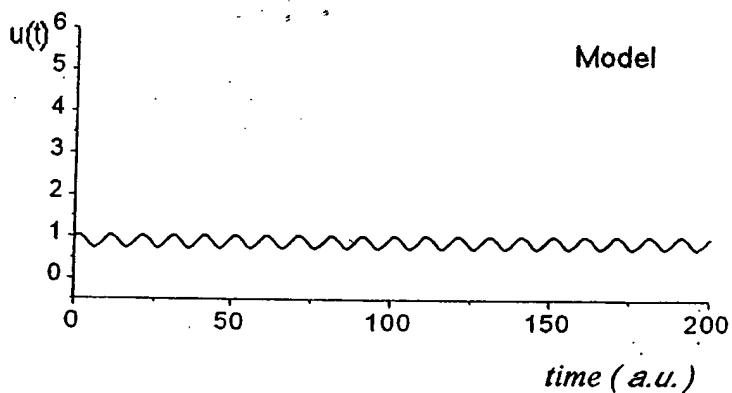


FIG.
4B

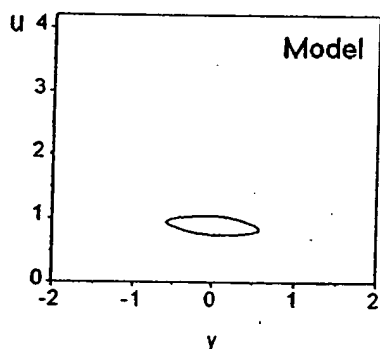


FIG.
4C

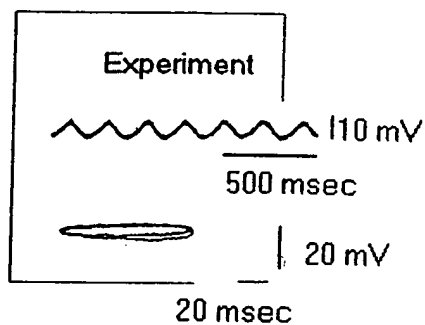


FIG.5A

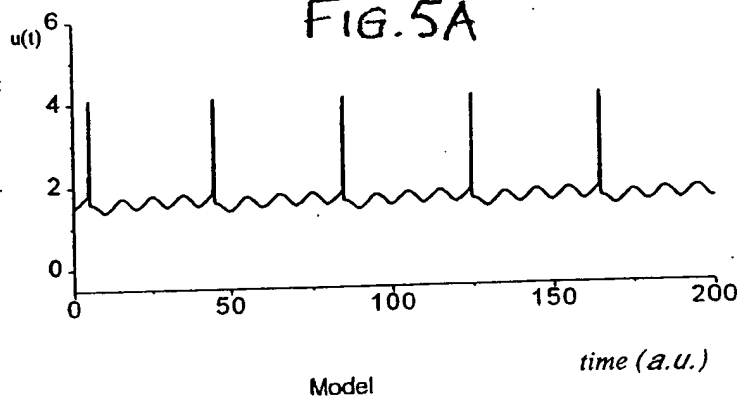
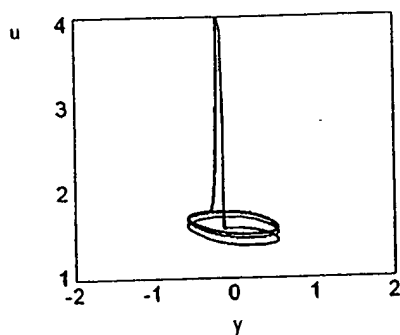
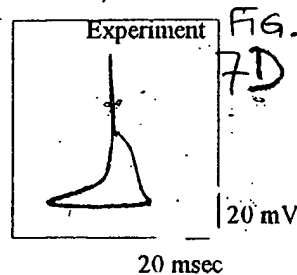
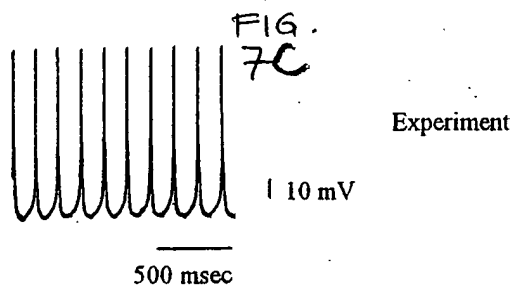
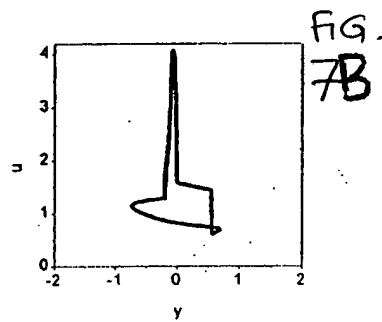
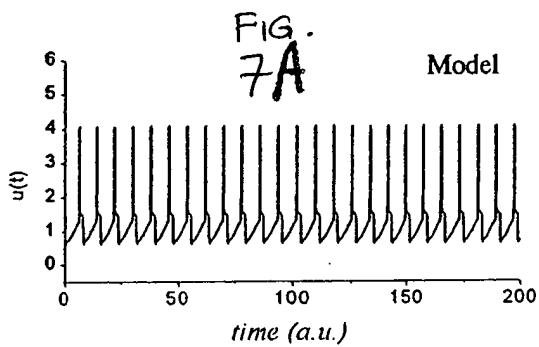
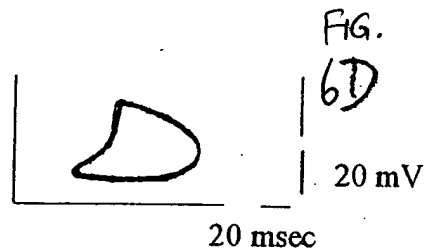
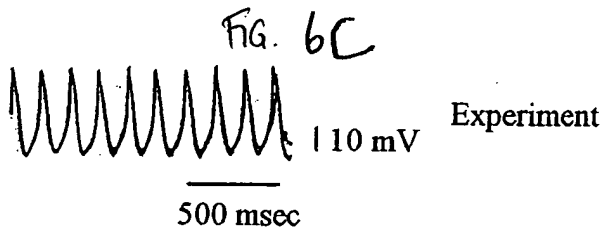
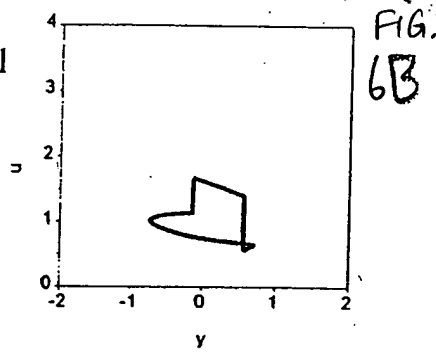
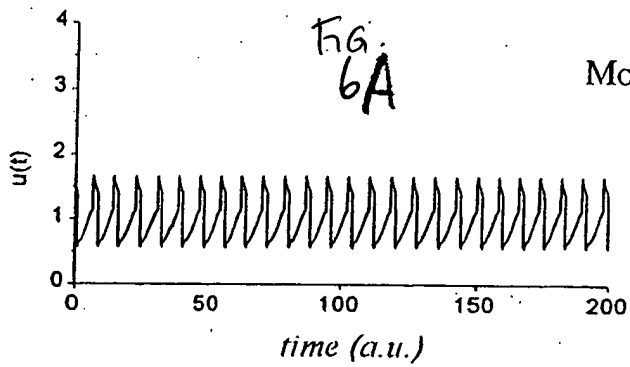
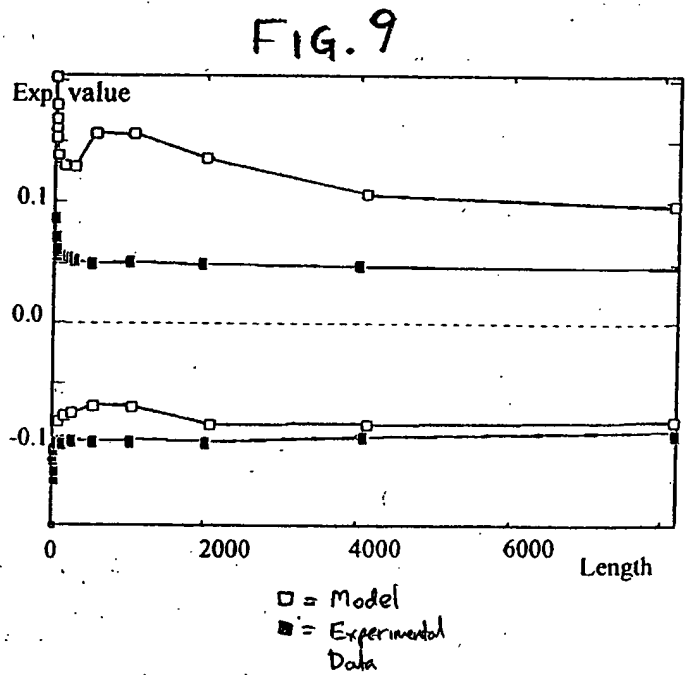
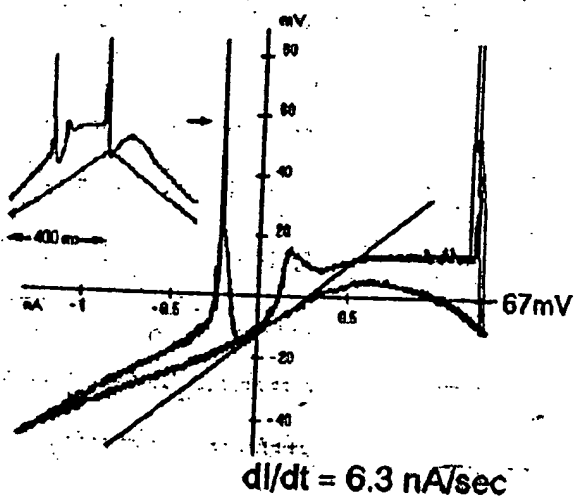
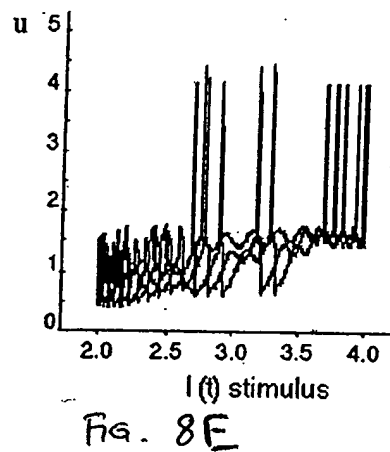
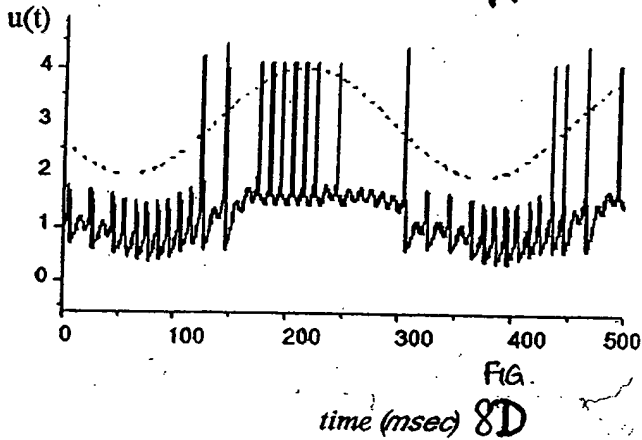
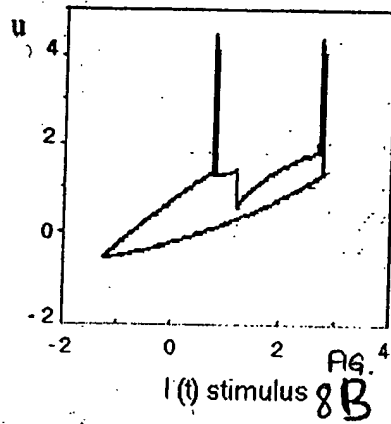
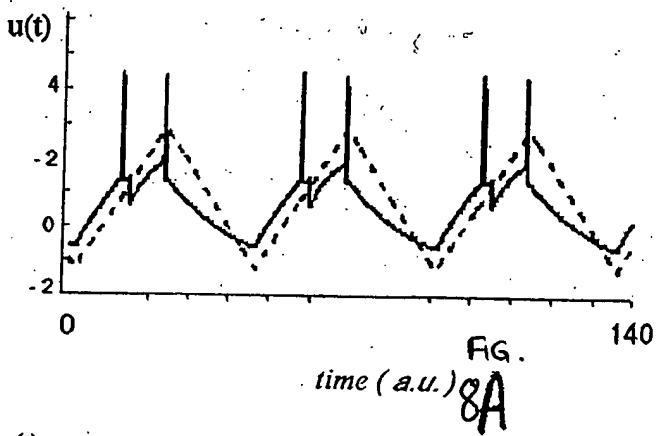


FIG.5B







Block-diagram of the circuit

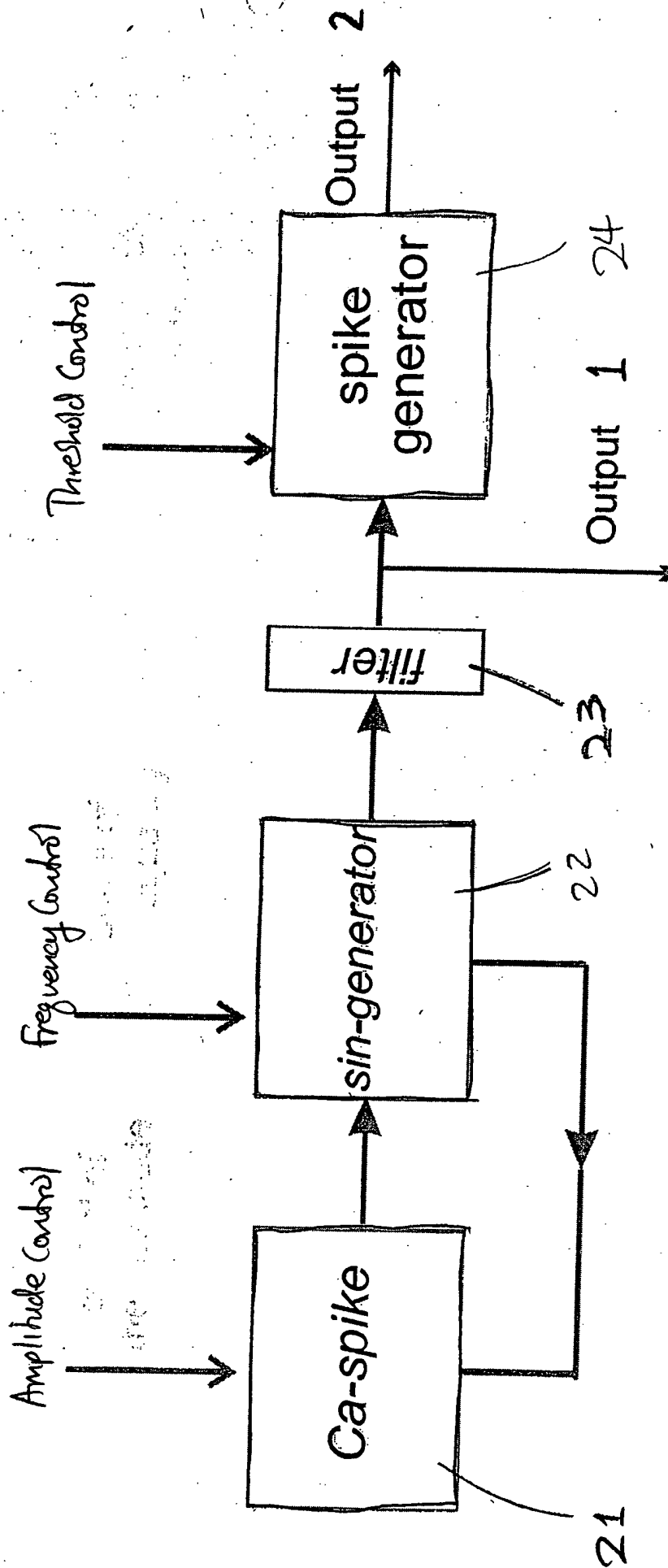
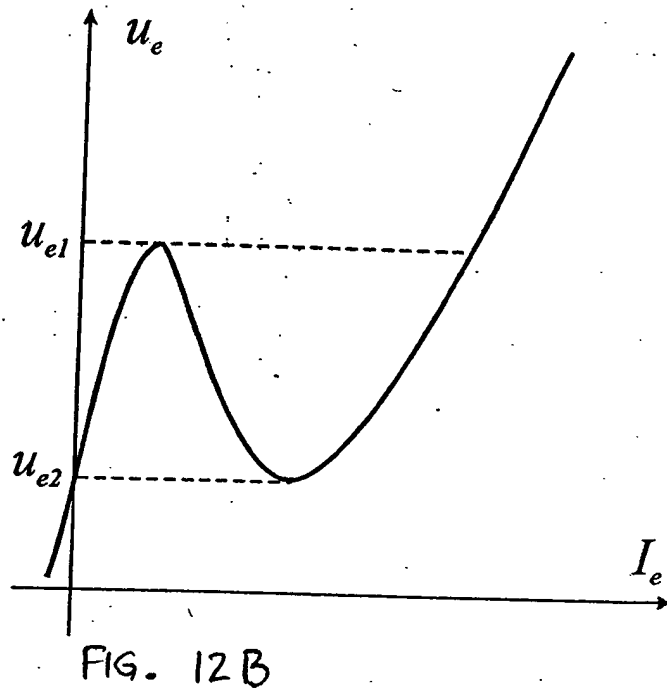
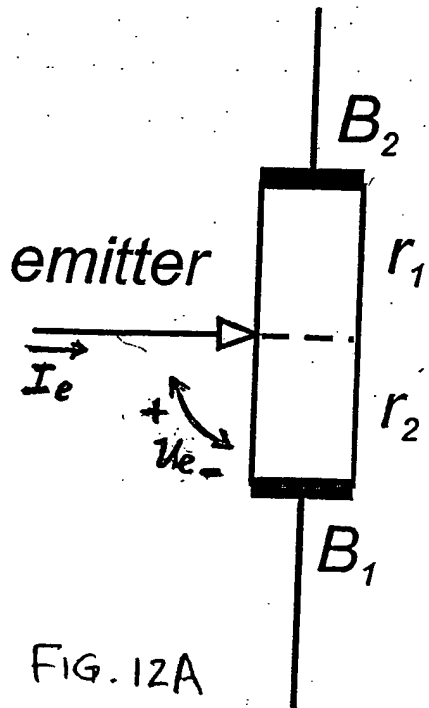


FIG. 10



Two chip experiments

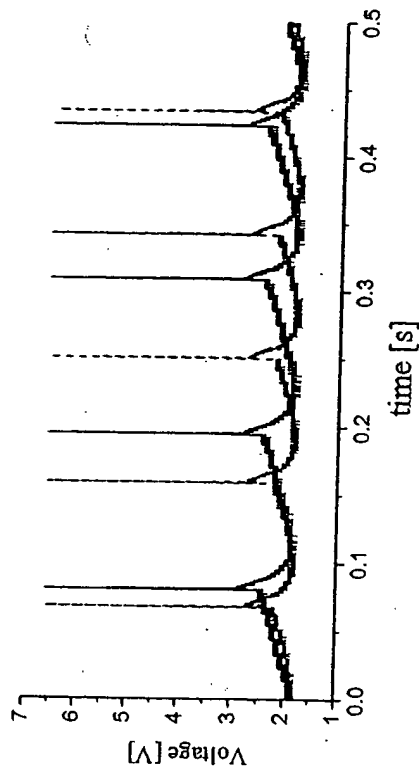
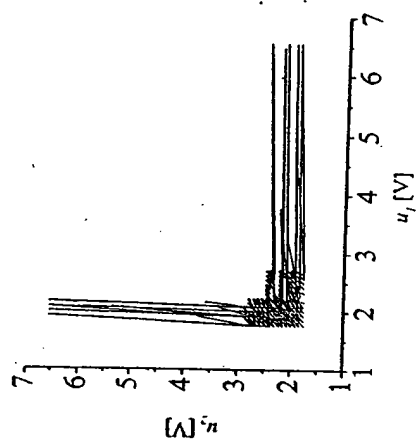


FIG. 13A



Uncoupled cells

FIG. 13B

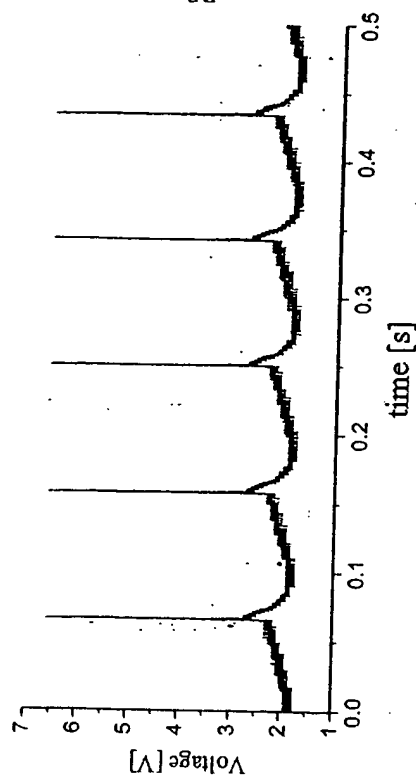
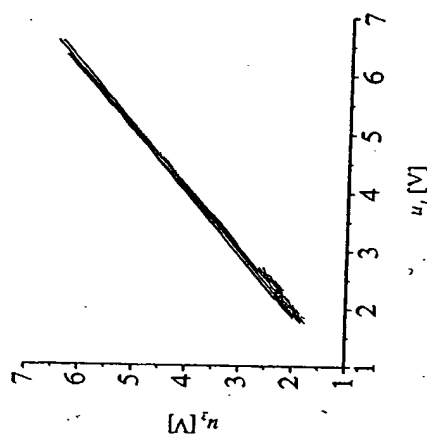


FIG. 13C



Synchronization

FIG. 13D

Synchronous and asynchronous spiking

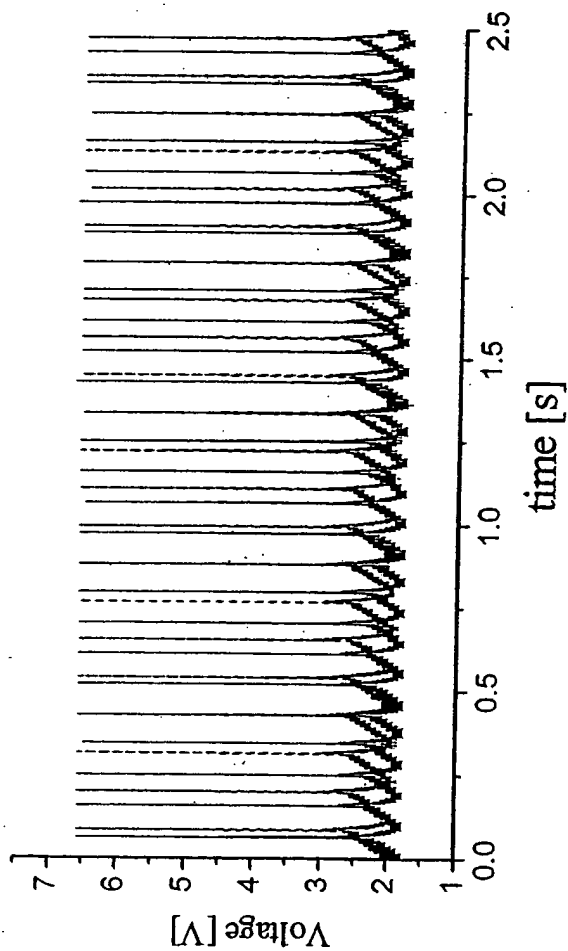


FIG. 14A

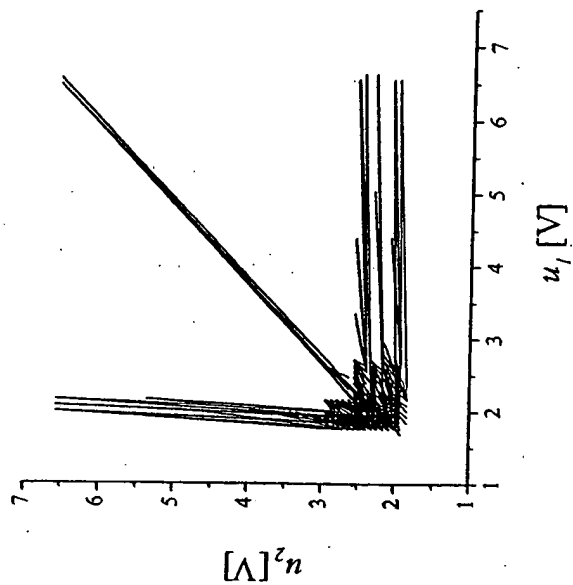
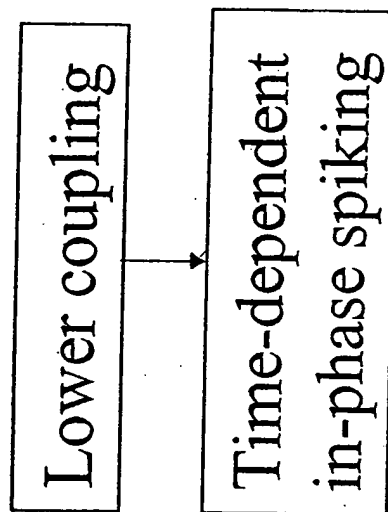


FIG. 14B



1000

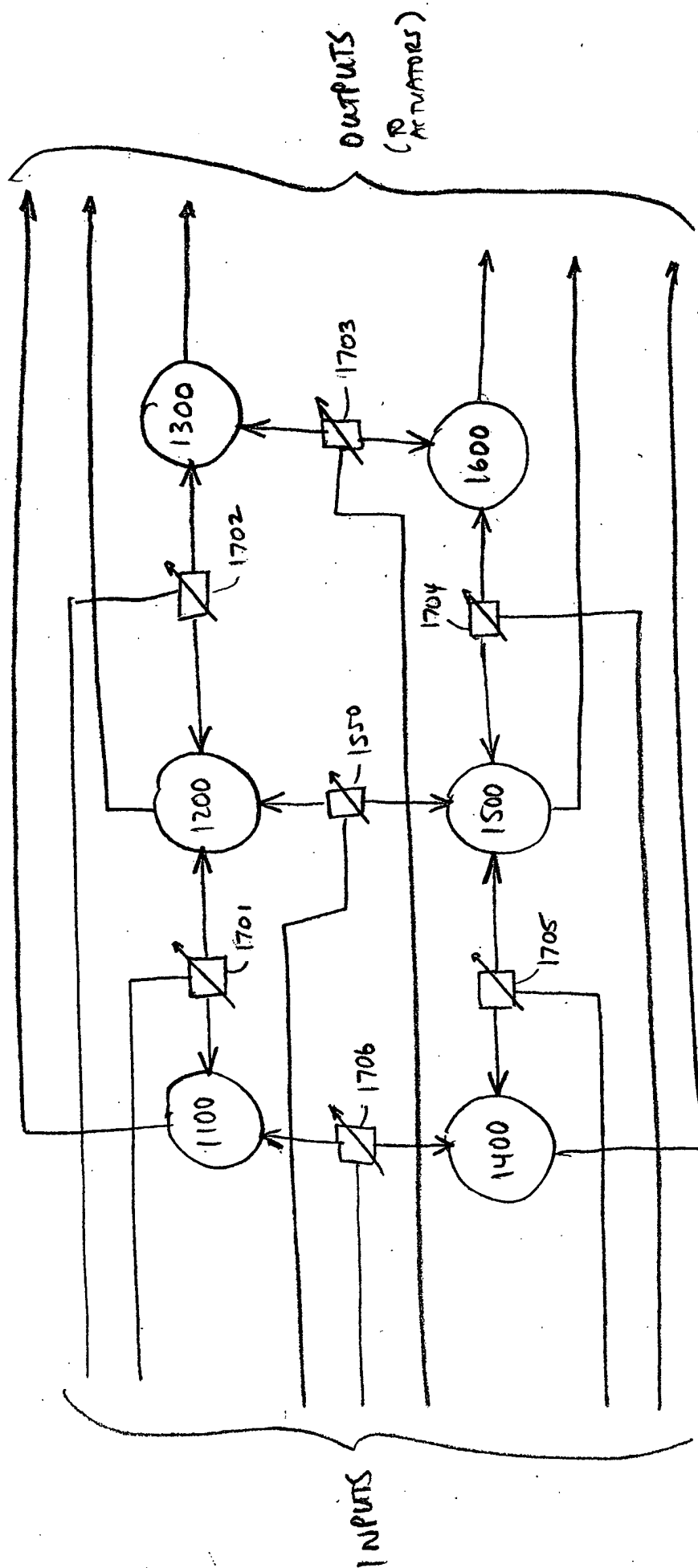
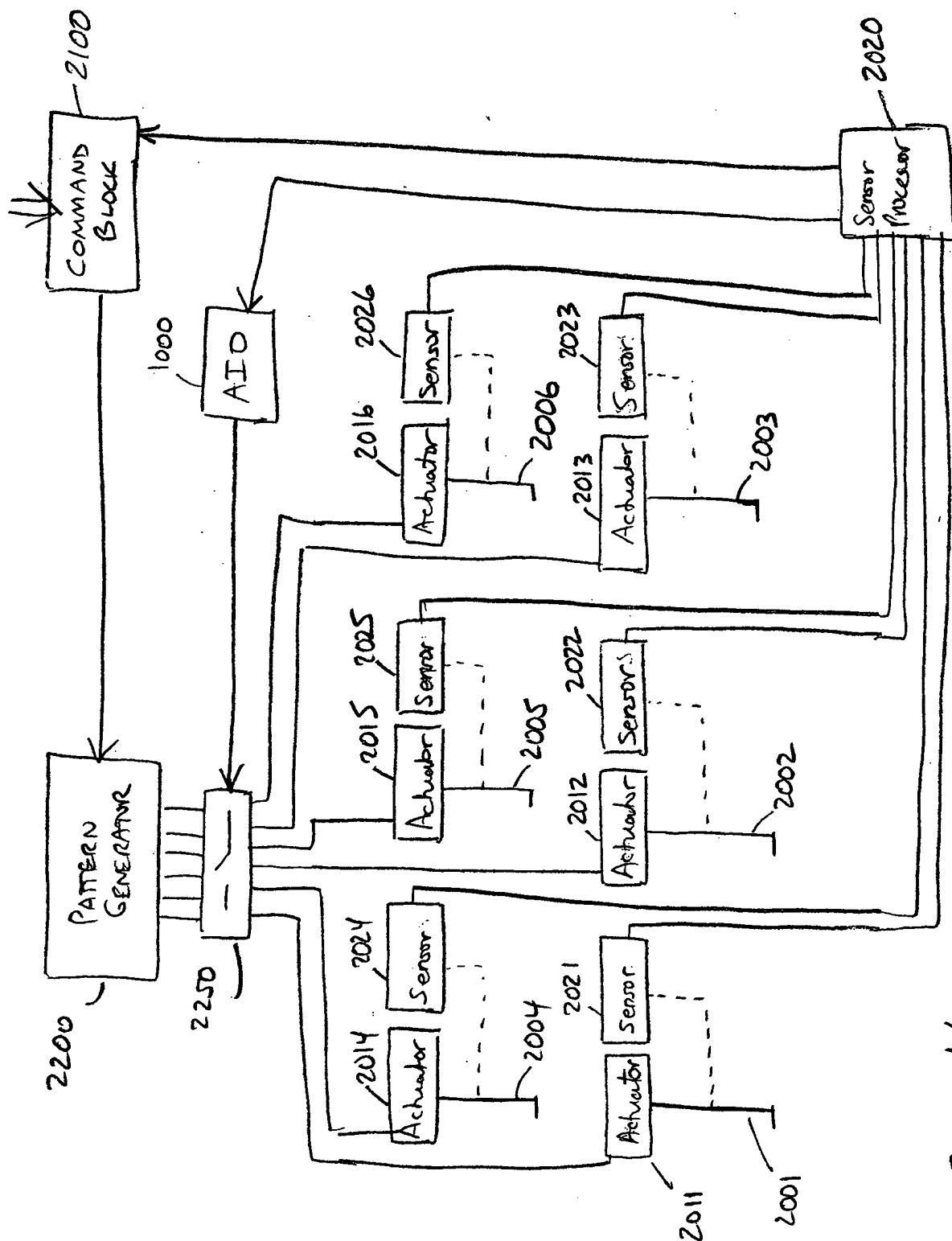


Fig. 15



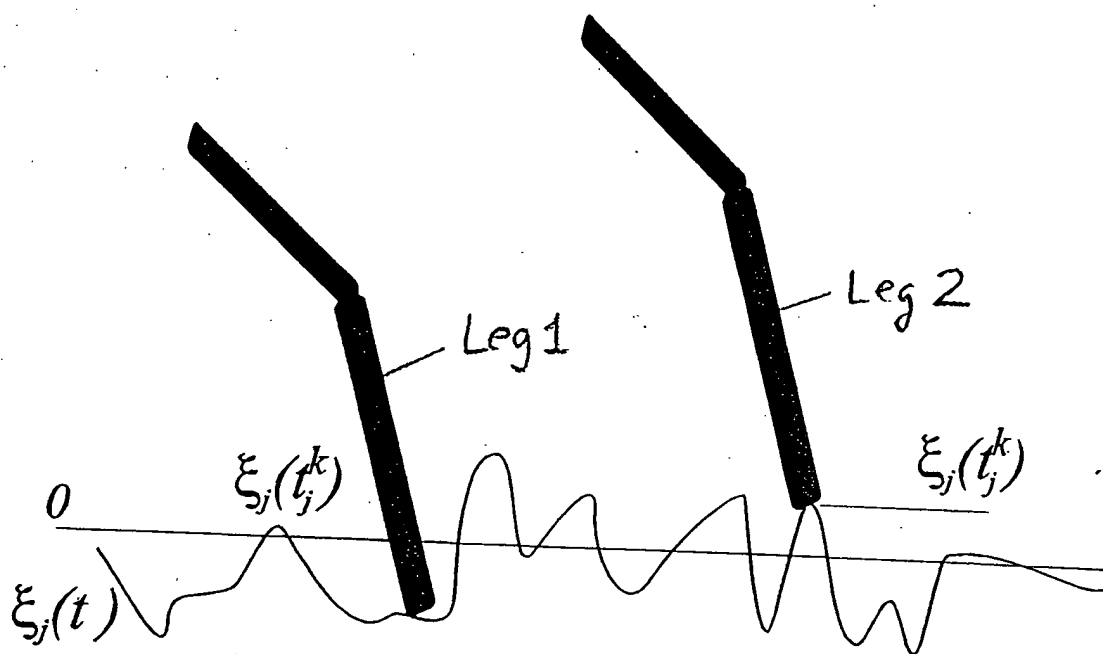
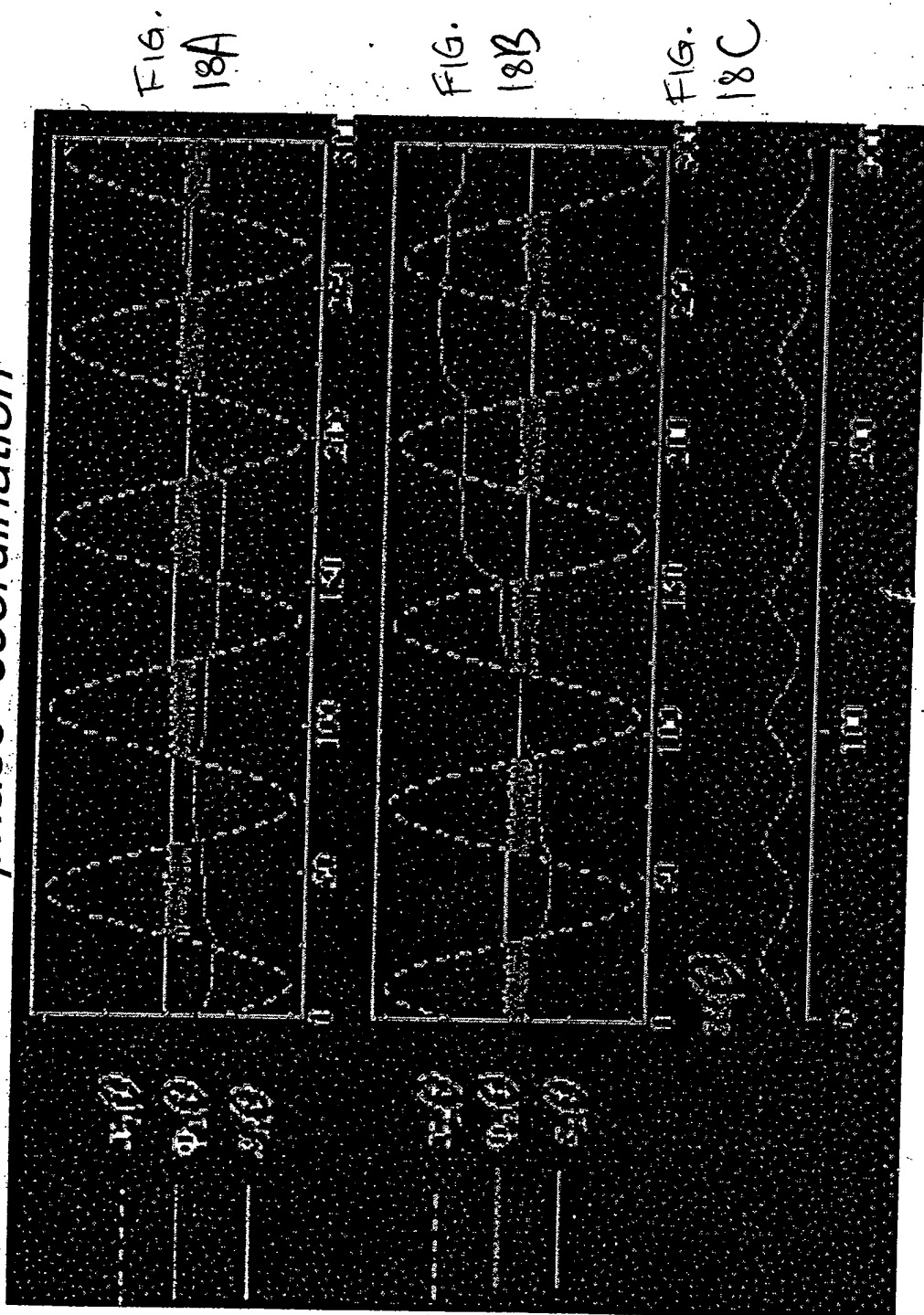


FIG. 17

Global phase coordination



No control

Coordination with discrete control

FIG.
19A

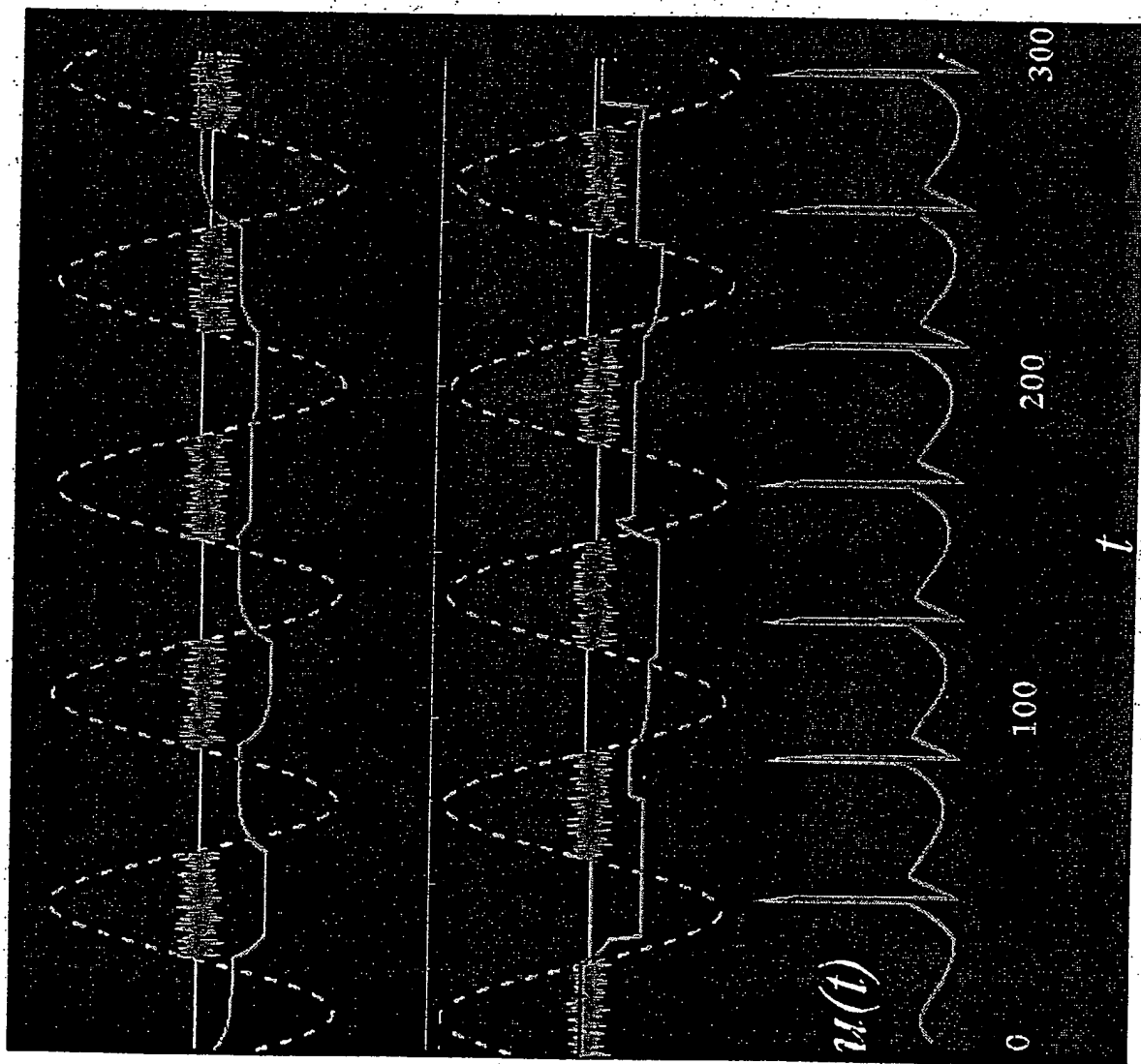
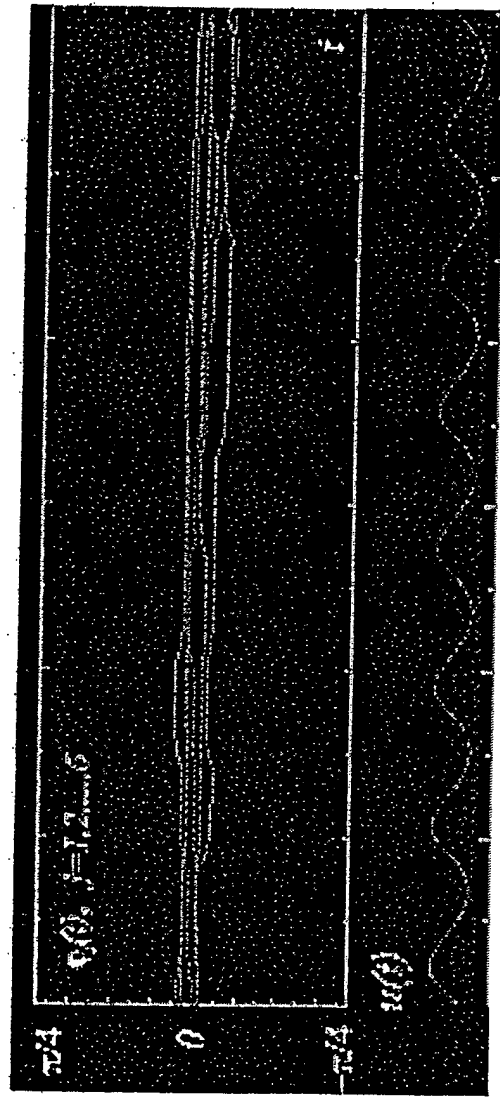


FIG.
19B

FIG.
19C

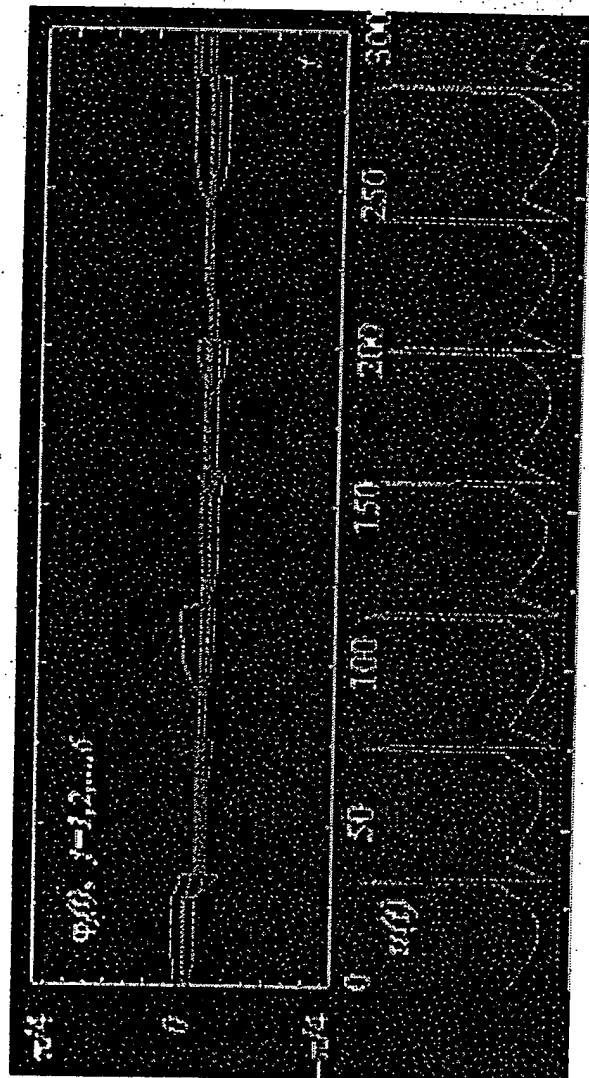
The control signal recovers
the correct phase shift
relations

Evolution of phases



No control – phases evolve according to self-tuning mechanisms

FIG. 20A



Discrete control – the movement is controlled to sustain the walking gate

FIG. 20B

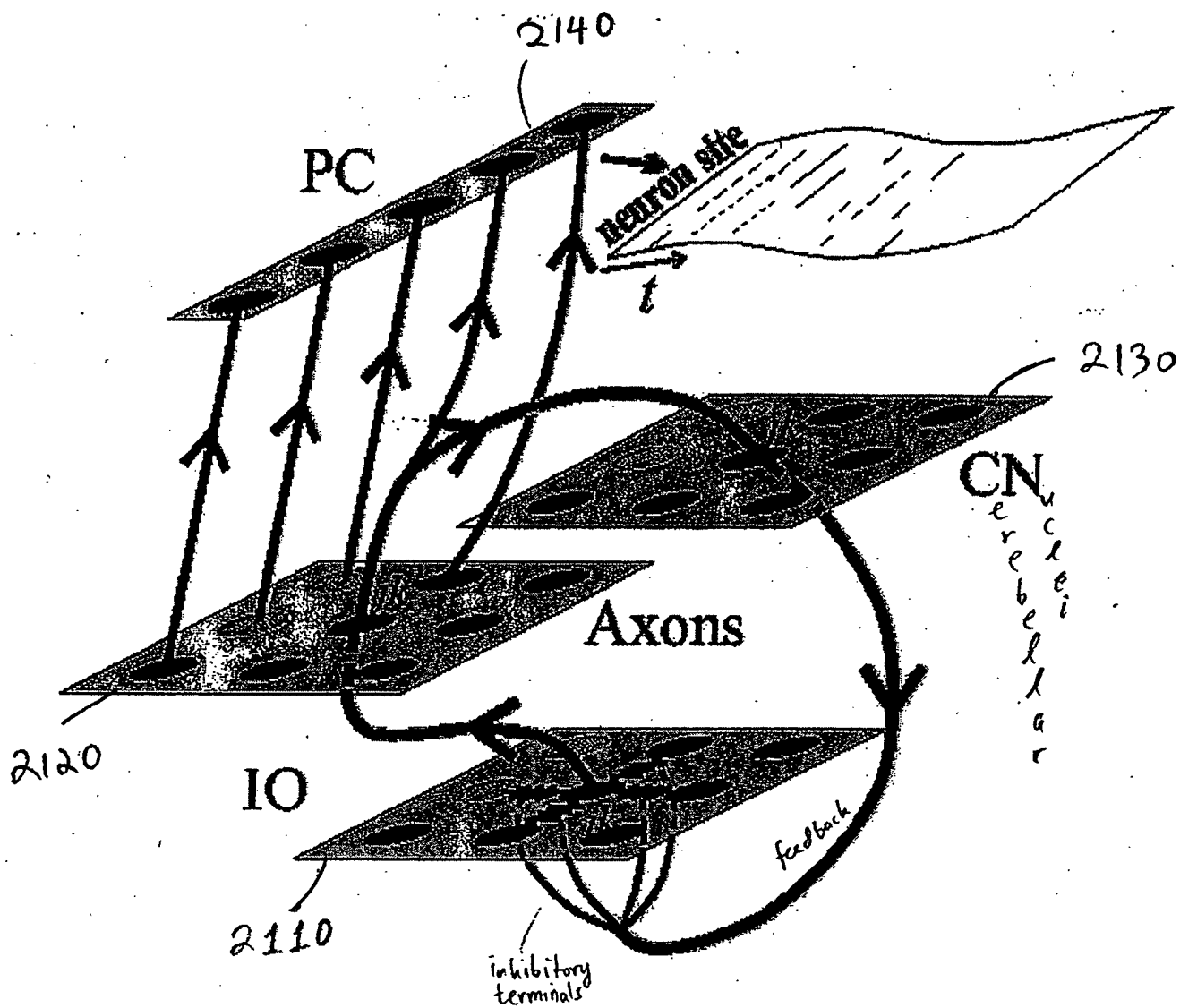


Figure 21

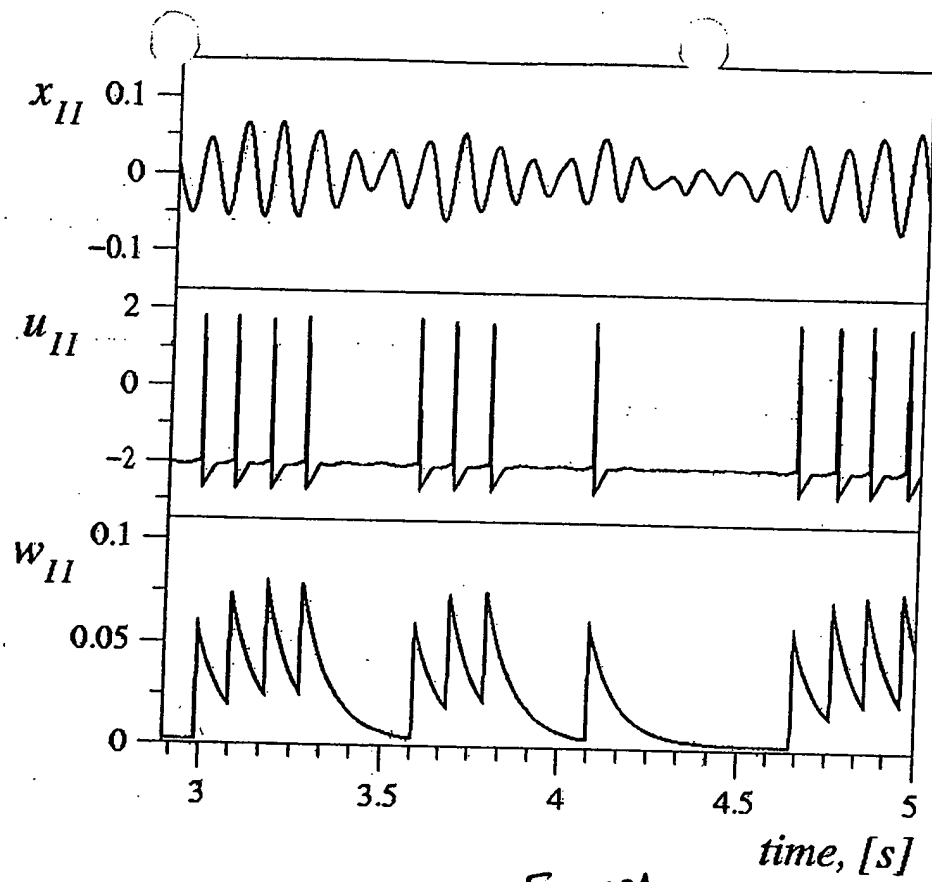


FIG.22A

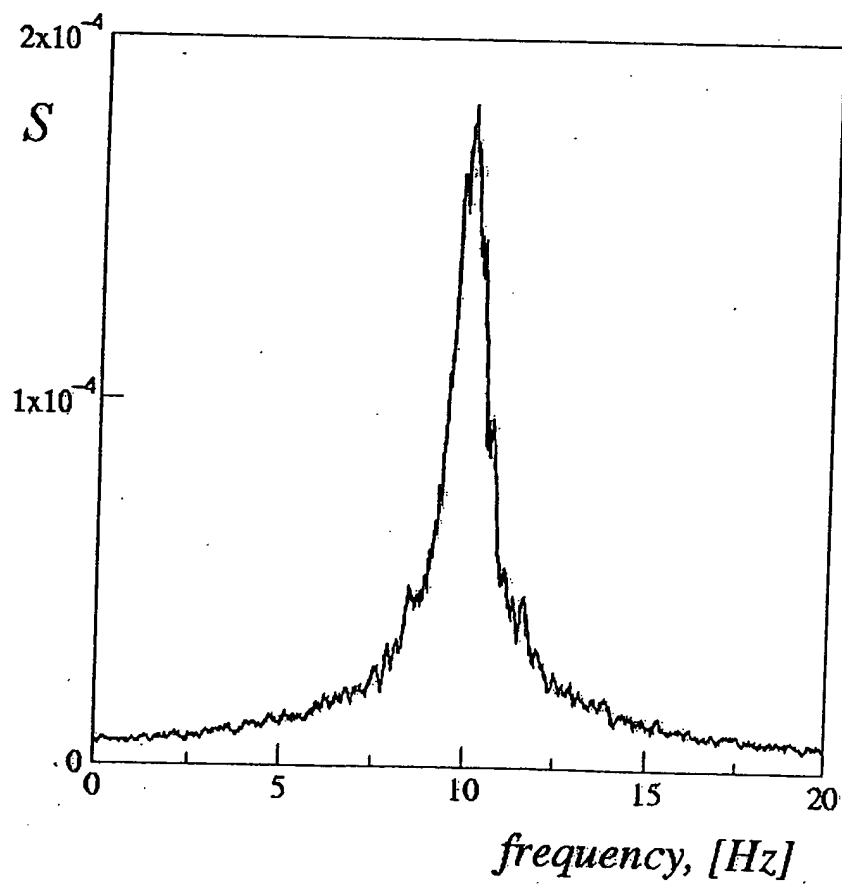


FIG.22B

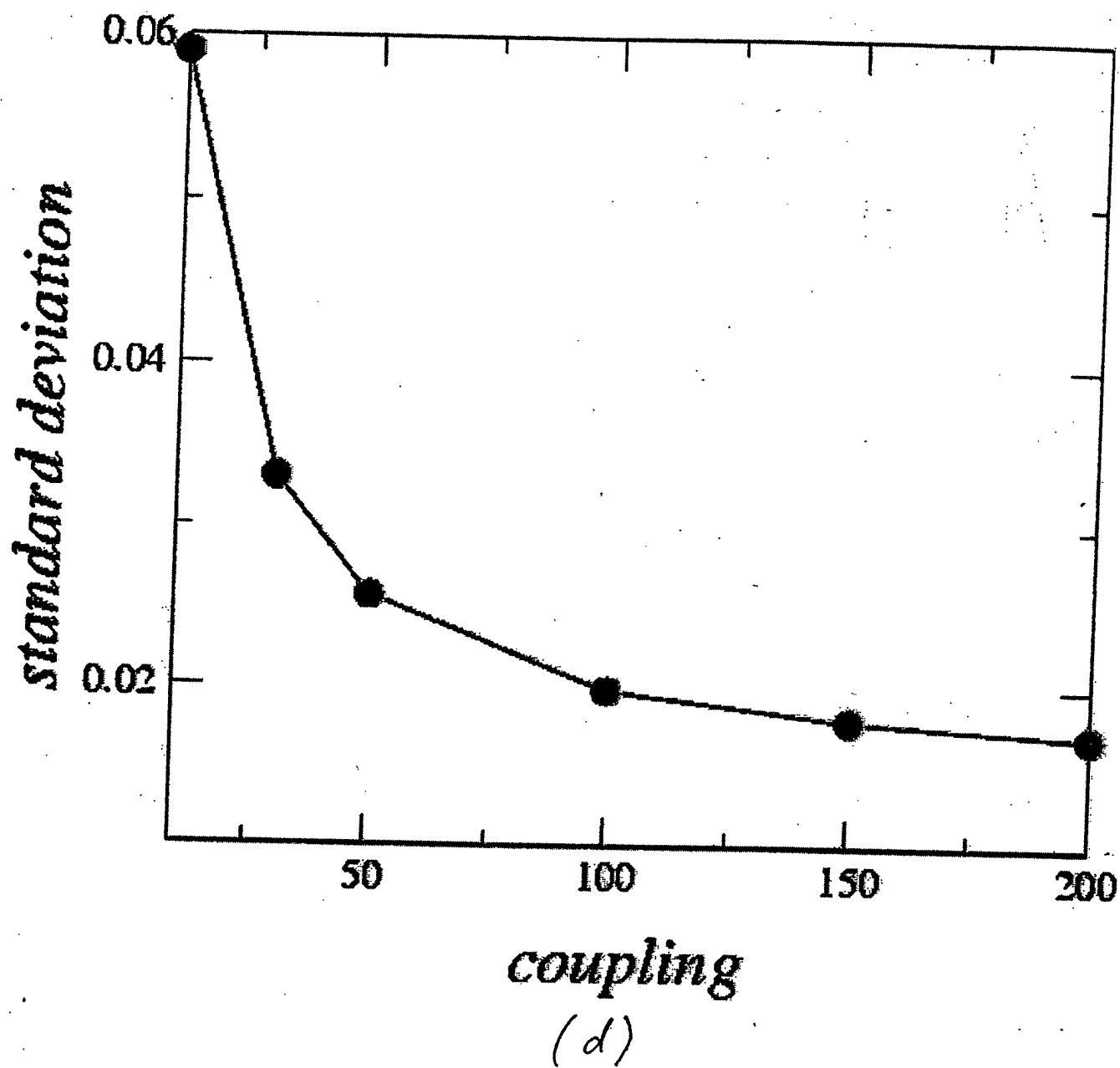


Figure 23

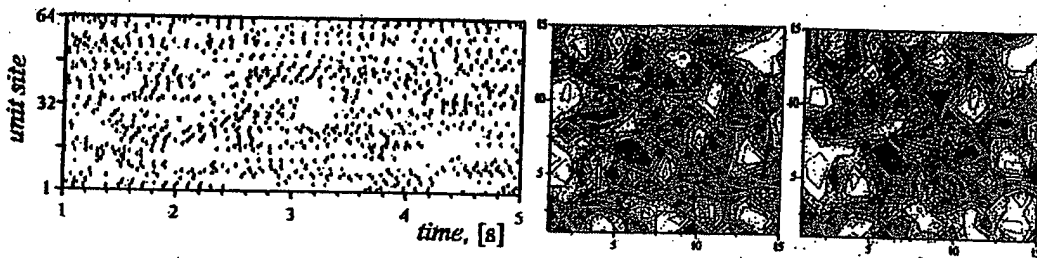


FIG. 24A

$$d = \emptyset$$

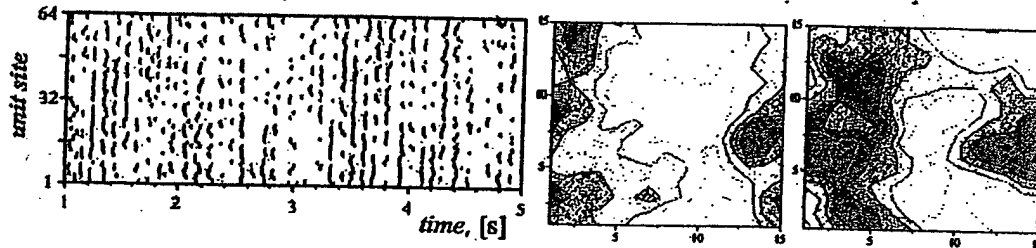


FIG. 24B

$$d = 5\emptyset$$

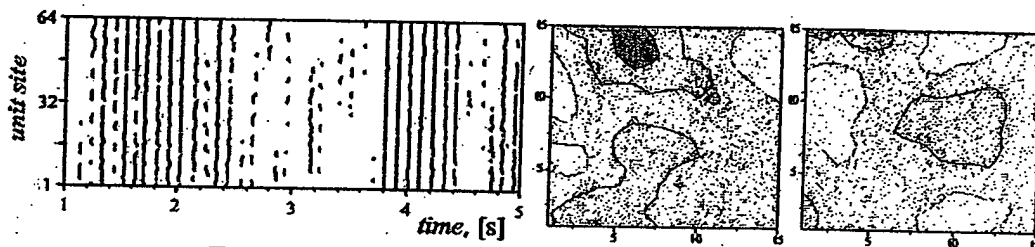


FIG. 24C

$$d = 200$$

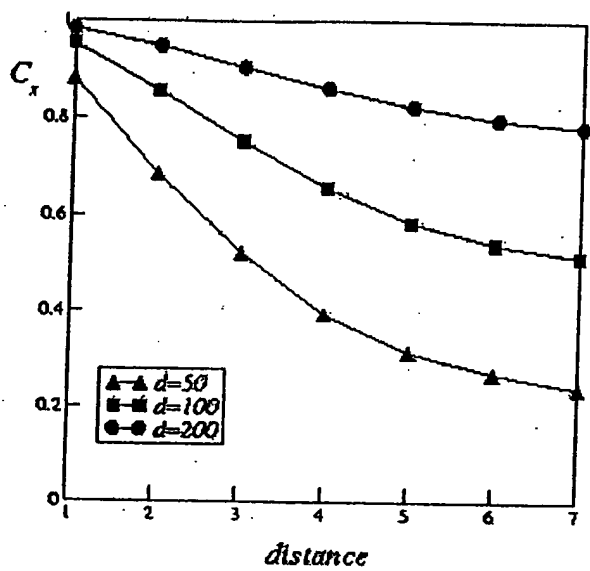


FIG.25A

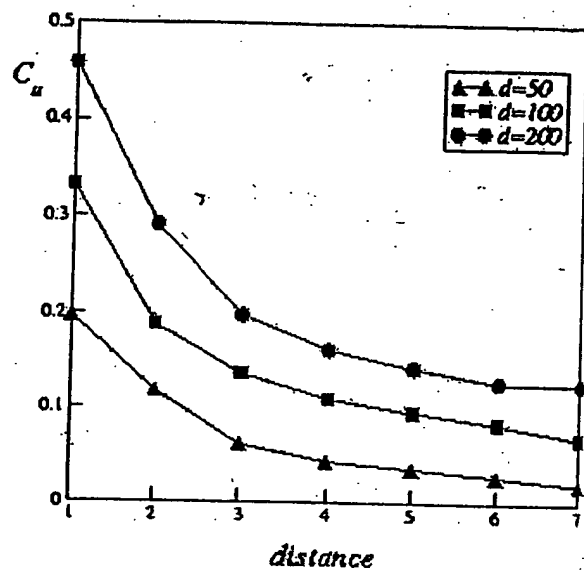


FIG.25B

FIG. 26A

w_{II}

0.1
0.05
0

FIG. 26B

w_{I2}

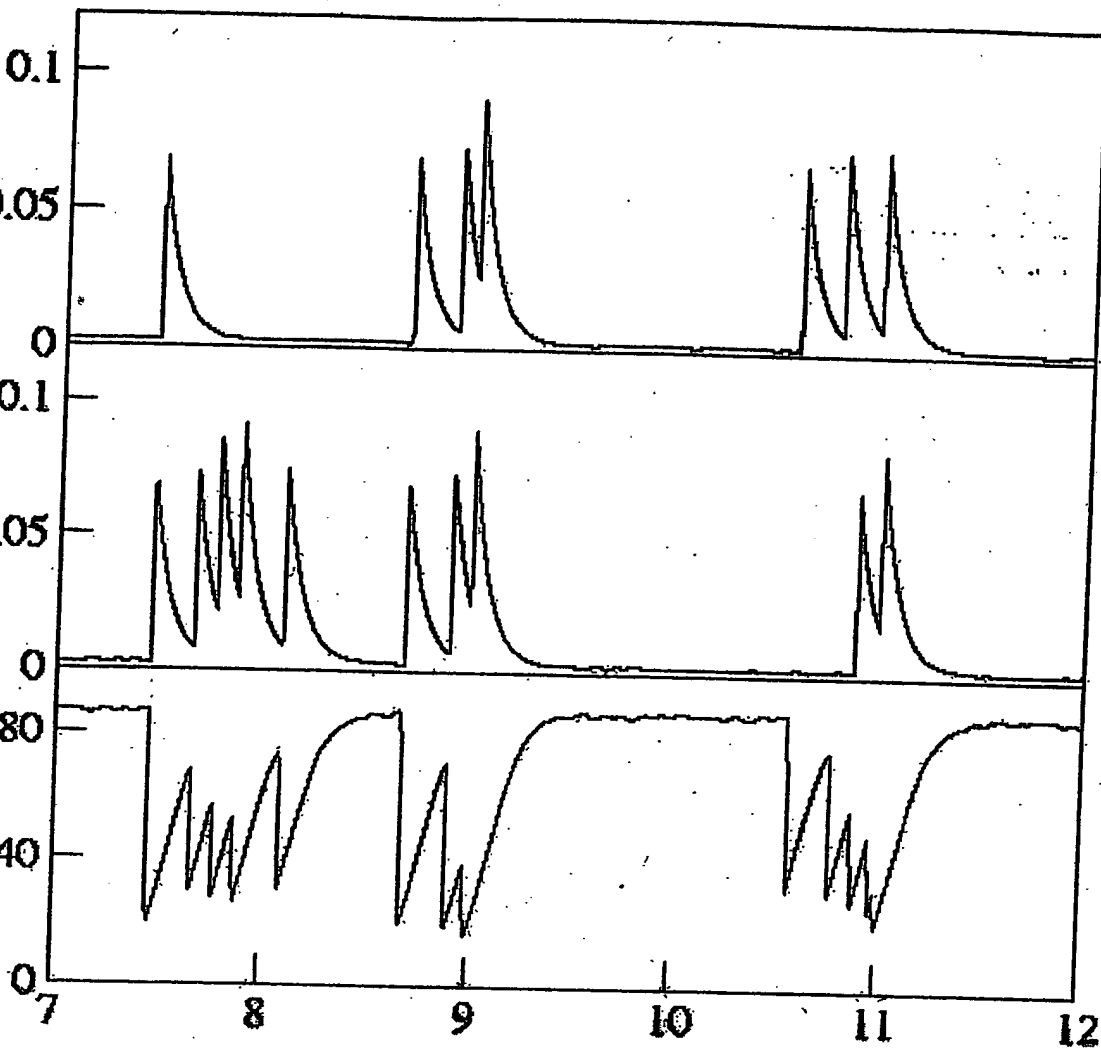
0.1
0.05
0

FIG. 26C

d_{I2}^{II}

80
40
0

time [s]



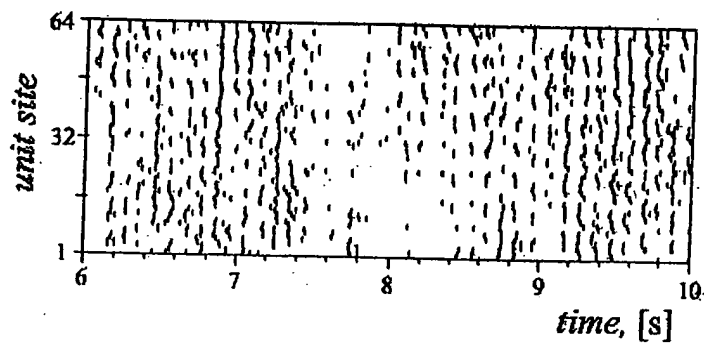


Fig. 27A

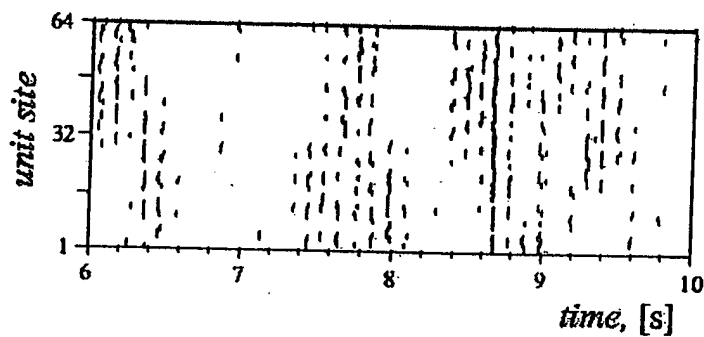


Fig. 27B

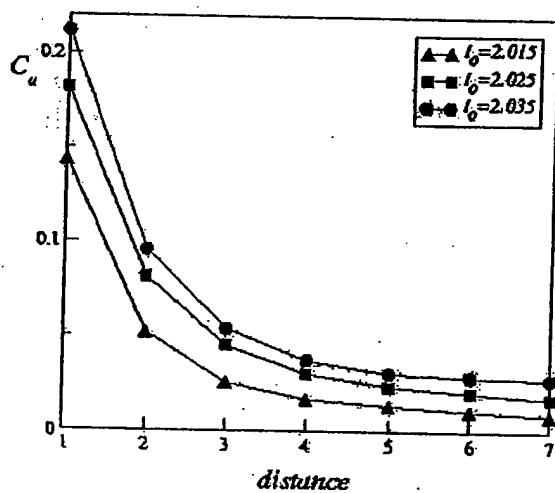
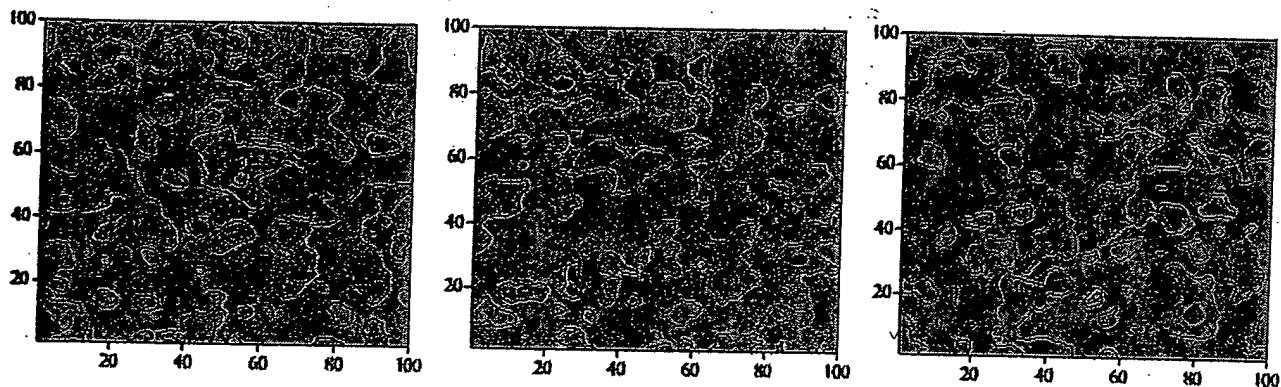
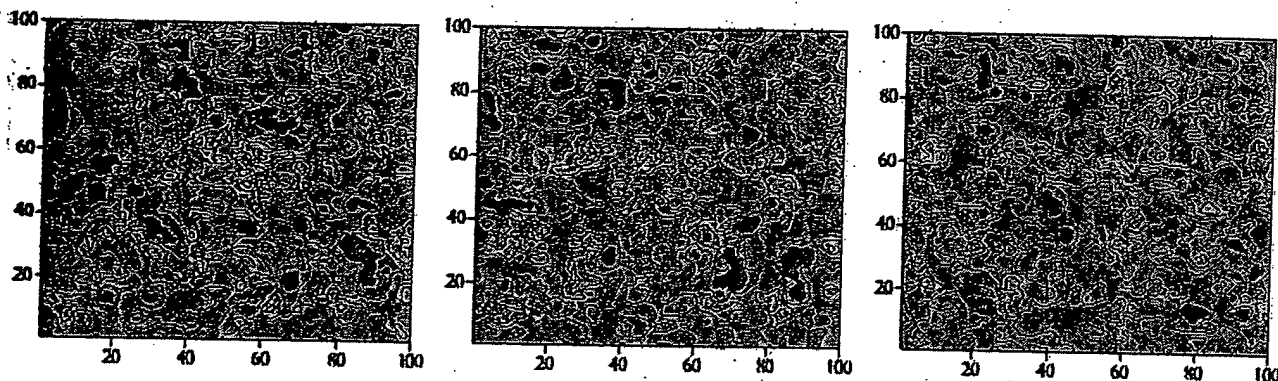


Fig. 27C



- constant
coupling
- no feedback
($\Gamma = \emptyset$)

FIG. 28A



feedback
 $\Gamma \neq \emptyset$

FIG. 28B

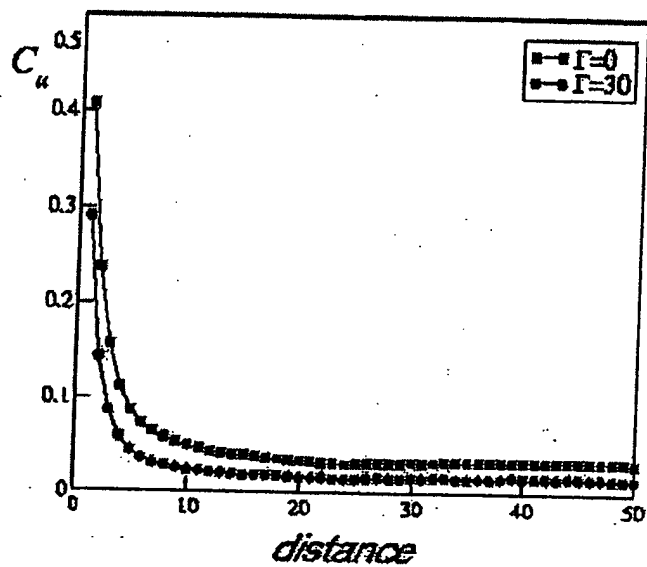


FIG. 29A

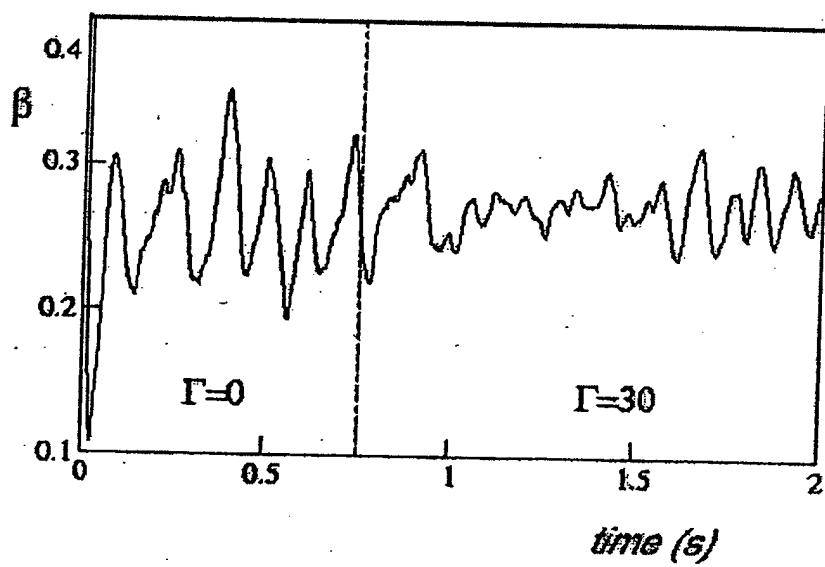


FIG. 29B

FIG. 30A

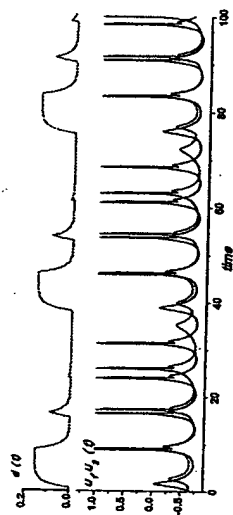
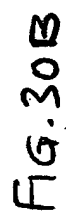


FIG. 31A

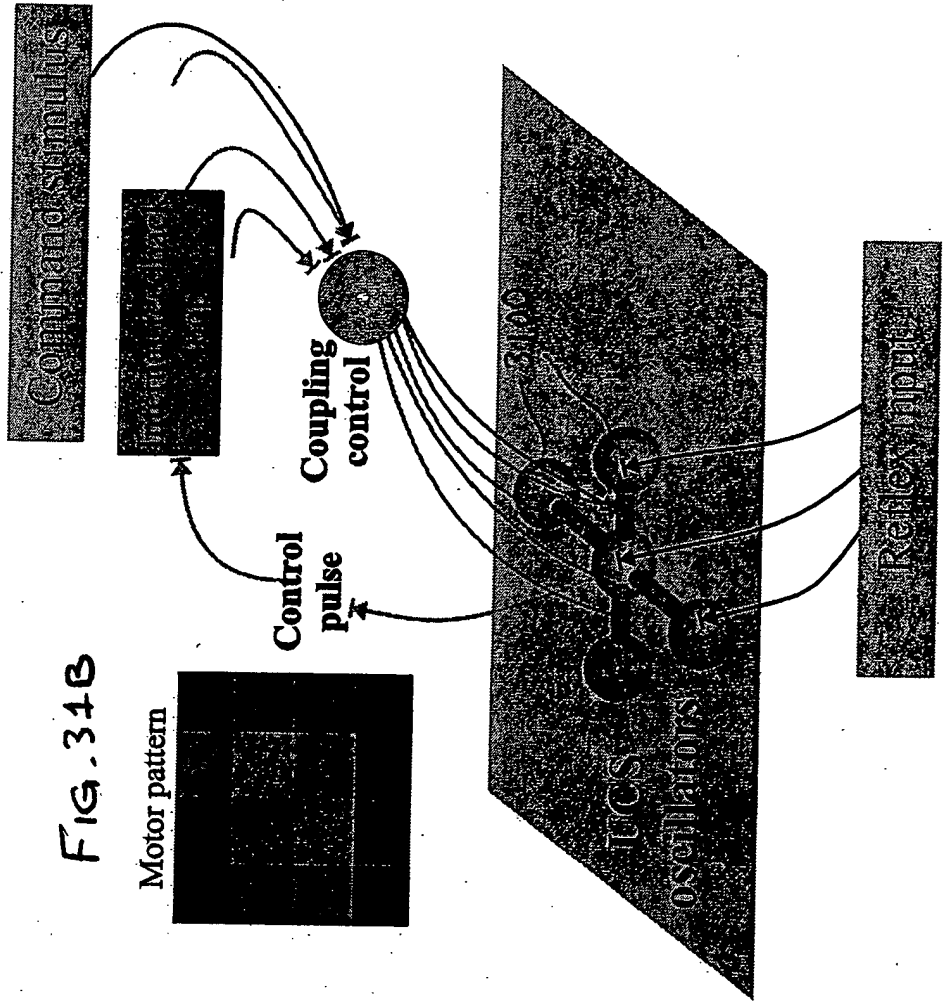


FIG. 31B

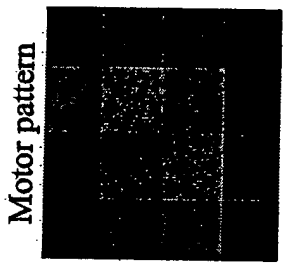


FIG. 32A

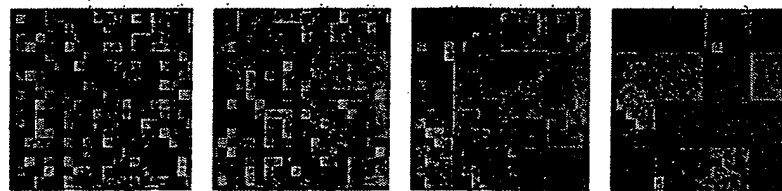


FIG. 32B

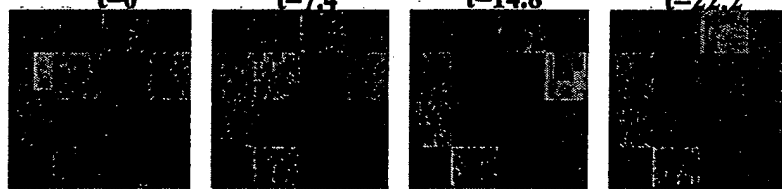


FIG. 32C

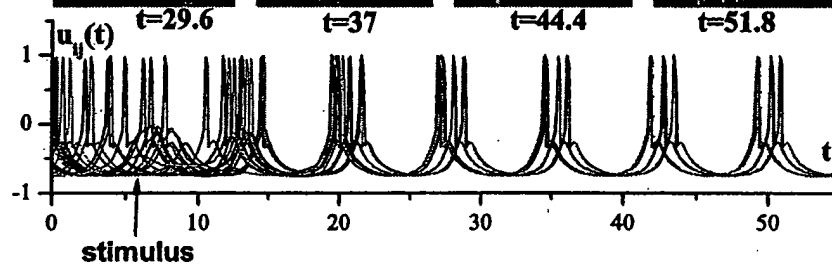


FIG. 33A

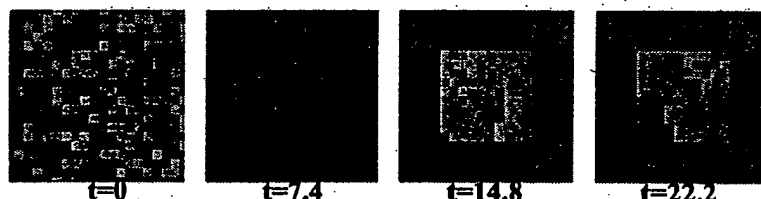


FIG. 33B

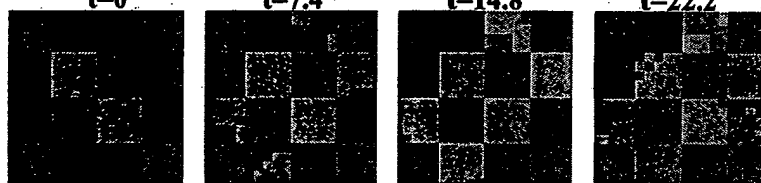


FIG. 33C

